

Wucheng Sun

PHD STUDENT

Profile

I am a **2nd year PhD student**, majoring in **Geological Engineering**, aiming to achieve better performance in **deep, hard rock drilling** with **impregnated diamond bits**.

My research interest is **wear damage of diamonds & metal matrix composites**, with which I try to solve through the application of novel analytical methods involving **image analysis** and **data analysis** based on **machine learning/deep learning**.

Education

Bachelor of Engineering, China University of Geosciences

SEPTEMBER 2014 – JUNE 2018

- Got the university-level outstanding undergraduate thesis award (5%): *Application of UFD theory and optimization of fracturing parameters in low permeability reservoir* (Undergraduate thesis about hydraulic fracturing)

Master of Engineering, China University of Geosciences

SEPTEMBER 2018 – JUNE 2020

- Worked on a collaborative project about Green exploration in hydrogeological drilling: *Development and application of automatic mud circulation purification device for green exploration hydrogeological drilling* (Project)

PhD of Engineering, China University of Geosciences

SEPTEMBER 2020 – PRESENT

- Working on a NSFC research project about wear of diamond bits: *Study on the wear behavior of hot-pressed WC-Cu based impregnated diamond bit under hydraulic percussive-rotary drilling condition* (Project).

Publication

[1] Chai, X., **Sun, W.**, Duan, L., Dong, G., Zang, L. (2019). Design and Development of Mechanical System for an Automatic Mud Circulation and Purification Device[J]. *Metal Mine*, 48(07): 182-188. (Chinese)
<http://doi.org/10.19614/j.cnki.jsks.201907030>

[2] Wang, Z., Fang, X., **Sun, W.**, Duan, L., & Tan, S. (2021). D-Optimal Mixture Design of Fe-Based Pre-Alloyed Diamond Bit Matrix with Low Liquid Phase Content. *Journal of Superhard Materials*, 43(4), 265-277.
<http://doi.org/10.3103/S1063457621040080>

[3] **Sun, W.**, Gao, H., Tan, S., Wang, Z., & Duan, L. (2021). Wear detection of WC-Cu based impregnated diamond bit matrix based on SEM image and deep learning. *International Journal of Refractory Metals and Hard Materials*, 98, 105530.
<https://doi.org/10.1016/j.ijrmhm.2021.105530>

Research Experience

- Powder Metallurgy & Hot Pressing, Mechanical Testing
- SEM, XDS, XRD, Raman Spectrum
- Quantitative Analysis of Tool Wear based on SEM images and Deep Learning
- Mechanical Property Prediction of Sintered Tools based on Deep Learning

Details

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NATIONALITY

Chinese

Research Interests & Skills

Diamond Tools

Metal Matrix Composite

Powder Metallurgy

Friction & Wear

Machine Learning

Deep Learning

Data Analysis

Image Analysis

Python

Languages

Chinese (Native)

English (IELTS = 7.0)

Personal Website

<https://sunwucheng.com>